Virtual Diabetes Prevention Program: effects on Medicare Advantage healthcare costs and utilization

Background
Diabetes affects approximately 13% of the population in the US and is the fourth leading cause of death. Studies have shown that the need for healthcare services and consequently costs become greater when people with prediabetes progress to diabetes. The in-person Diabetes Prevention Program (DPP) has been shown to be effective in older adults. A subgroup of older adults participating in a digital version of the DPP reported meaningful weight loss and improvement in glucose and lipid control. The analysis reported here is based on the same study of digital DPP and focuses on healthcare utilization costs.

Objective
To determine whether a digital DPP conducted in a Medicare Advantage population significantly influenced healthcare utilization costs.

Methods
Study Design: Retrospective Cohort study
Data Source:
• Claims and enrollment data, Humana Inc.
• Consumer data from an external vendor (AmeriLife/FRAME)
Intervention (DPP program enrollment): 12-month digital DPP (the Omada Health program) that included a weekly newsletter, website, nutrition tracker, educational lessons, health coaching, and peer support through an online platform.
Program Eligibility Inclusion Criteria:
• Enrollment in Medicare Advantage and Drug Plan (MAPD) during 2015
• Evidence of metabolic syndrome or prediabetes in claims data
Exclusion Criteria:
• Age > 65 or > 75 years, hospice, end-stage renal disease, or diagnosis of diabetes
Program Participation Pool:
• Invitations were sent to two waves of a random sample of individuals, for a total of 4,897 invitees
Control Group Pool:
• Randomly chosen from among individuals eligible for the program who did not receive an invitation.

Matching
Controls matched 1:1 to program participants by propensity score (PS) and engagement score (ES) (propensity to participate in program and engagement score [ES] propensity to engage once enrolled).

Outcomes (measured up to 24 months following program start):
• Per member per month (PMPM) cost, including payment and patient costs
• Separate computation of total, medical and pharmacy costs.
• Number of visits: physician, emergency department, and outpatient

Statistical Analyses:
Utilization:
• Descriptive statistics
Costs:
• Differences-in-differences regression, using generalized linear models (gamma distribution for the cost outcomes and Poisson distribution for the utilization outcomes). Control variables included the PS and ES.

Results
Table 1. Key Characteristics of Study Group

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Program Participants</th>
<th>Matched Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>109</td>
<td>109</td>
</tr>
<tr>
<td>Age, years</td>
<td>68.9 (4.6)</td>
<td>69.2 (4.6)</td>
</tr>
<tr>
<td>Race, %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>395 (85.1%)</td>
<td>407 (87.7%)</td>
</tr>
<tr>
<td>Other</td>
<td>69 (14.9%)</td>
<td>57 (12.3%)</td>
</tr>
<tr>
<td>CCI score</td>
<td>2.8 (0.998)</td>
<td>2.9 (0.993)</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>1.0</td>
<td>0.7</td>
</tr>
<tr>
<td>Follow-up, months since program start (mean SD)</td>
<td>22.4 (4.9)</td>
<td>22.4 (4.9)</td>
</tr>
</tbody>
</table>

Of 123 variables in the PS, differences were significant for variables indicating level of household and participation in an HMO plan, CCI Comorbidity Index; HMO, Health Maintenance Organization; PS, propensity (to participate) score; ES, engagement score (average $1,298 (PMPM)). However, these results were not statistically significant, as indicated by the upper confidence interval limit remaining above the null value most months.

Figure 2. Cumulative Difference in Change over Time, PMPM Total Costs
Adjustment analysis suggested savings beginning 8 months after program start and a cumulative savings of $1,298 per member at 24 months (average $54 PMPM). However, these results were not statistically significant, as indicated by the upper confidence interval limit remaining above the null value most months.

Figure 3. Cumulative Difference in Change over Time, PMPM Medical Costs
The cumulative adjusted 24-month savings per member was $813 (average $34 PMPM), not statistically significant.

Figure 4. Cumulative Difference in Change over Time, PMPM Pharmacy Costs
The cumulative adjusted 24-month savings per member was $496 (average $21 PMPM); results statistically significant in months 18-24, last segment of measurement period.

Conclusions
A virtual DPP may change utilization patterns and reduce costs in a Medicare Advantage population. The increase in physician visits might reflect greater seeking of preventive care as a result of the prevention program. Reduction in pharmacy costs ahead of reduction in medical costs would be consistent with past experience with the particular Medicare Advantage population.

The virtual platform may be especially helpful to older adults with mobility and transportation limitations.

Limitations
• Lack of randomized treatment assignment, but this limitation is mitigated by the selection of controls who did not receive the invitation.
• Small sample of early responders to a one-time invitation with relatively low mean CCI score and baseline utilization. Effects might be larger in a more representative population.
• Possible lack of power to detect statistically significant effects due to small sample size.
• Short follow-up from end of program. Greater effects might be observed with longer follow-up.
• Limitations inherent in claims-based study, including missing data and coding errors.

References

Table 1. Study Group Flow Diagram

Table 2. Number of Healthcare Encounters over the Two Years Following Program Start

<table>
<thead>
<tr>
<th>Type of Visit</th>
<th>Mean-Number of Visits over 24 Months</th>
<th>Participants</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician visits</td>
<td>0.2</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Emergency Department visits</td>
<td>0.3</td>
<td>0.3</td>
<td>11.4</td>
</tr>
</tbody>
</table>

Utilization in terms of healthcare encounters did not differ between participants and non-participants.